

IN THE CLAIMS:

Please cancel claims 5 and 28-31 without prejudice.

Please amend claims 1, 7, 11, 12, 15, and 25-27, and add new claims 32-36 as follows:

1. (Twice Amended) An in-situ deposition and doping method for a polycrystalline silicon layer of a semiconductor device, said method comprising the steps of:

growing, in a deposition chamber, a first intermediate layer of in-situ doped polycrystalline silicon with a first thickness and a first doping level;

after growing the first intermediate layer, purging the deposition chamber by stopping all gas flow into the chamber and pumping residual gas out of the chamber, so as to remove all available dopant; and

after purging the deposition chamber, growing a second additional layer of polycrystalline silicon with a second thickness and a second doping level that is lower than the first doping level, wherein the first thickness is greater than the second thickness.

7. (Twice Amended) The in-situ deposition and doping method as defined in claim 1, further comprising the step of:

performing a subsequent thermal treatment to diffuse dopant from the first intermediate layer to the second additional layer,

wherein the average doping level of the first intermediate layer after the thermal treatment is at least about 1×10^{19} atoms/cm³.

11. (Twice Amended) The in-situ deposition and doping method as defined in claim 10, further comprising the step of:

performing a subsequent thermal treatment to diffuse dopant from the first intermediate layer to the second additional layer,

wherein the average doping level of the first intermediate layer after the thermal treatment is at least about 1×10^{19} atoms/cm³.

12. (Twice Amended) The in-situ deposition and doping method as defined in claim 10, further comprising the step of:

performing a subsequent re-oxidation treatment to diffuse dopant from the first intermediate layer to the second additional layer,

wherein the average doping level of the first intermediate layer after the re-oxidation treatment is at least about 1×10^{19} atoms/cm³.

15. (Twice Amended) An in-situ deposition and doping method for a polycrystalline silicon layer of a semiconductor device, said method comprising the steps of:

growing, in a deposition chamber, a first intermediate layer of in-situ doped polycrystalline silicon with a first thickness and a first doping level;

after growing the first intermediate layer, purging the deposition chamber by stopping all gas flow into the chamber and pumping residual gas out of the chamber, so as to remove all available dopant;

after purging the deposition chamber, growing a second additional layer of polycrystalline silicon with a second thickness; and

performing a re-oxidation thermal treatment to diffuse dopant from the first intermediate layer to the second additional layer,

wherein the second additional layer is substantially not doped, and the first thickness is greater than the second thickness.

25. (Amended) An in-situ deposition and doping method for a polycrystalline silicon layer of a semiconductor device, said method comprising the steps of:

growing a first intermediate layer of in-situ doped polycrystalline silicon with a first thickness and a first doping level; and

growing a second additional layer of polycrystalline silicon with a second thickness and a second doping level that is lower than the first doping level,

wherein the first thickness is at least about 8 times greater than the second thickness.

26. (Amended) The in-situ deposition and doping method as defined in claim 25, wherein the first thickness is at least about 10 times greater than the second thickness.

27. (Amended) The in-situ deposition and doping method as defined in claim 1, wherein the polycrystalline silicon layer of the semiconductor device consists of only the first intermediate layer and the overlying thinner second additional layer that provides a barrier during any subsequent thermal treatment.

Please add new claims 32-36 as follows:

--32. (New) The in-situ deposition and doping method as defined in claim 25, further comprising the step of performing a subsequent thermal treatment to diffuse dopant from the first intermediate layer to the second additional layer, the thinner second additional layer providing a barrier during the thermal treatment.--

--33. (New) An in-situ deposition and doping method for a polycrystalline silicon layer of a semiconductor device, said method comprising the steps of:

growing a first intermediate layer of in-situ doped polycrystalline silicon with a first thickness and a first doping level;

growing a second additional layer of polycrystalline silicon with a second thickness and a second doping level that is lower than the first doping level; and

performing a subsequent thermal treatment to diffuse dopant from the first intermediate layer to the second additional layer,

wherein the first thickness is greater than the second thickness such that the average doping level of the first intermediate layer after the thermal treatment is at least about 1×10^{19} atoms/cm³.--

--34. (New) The in-situ deposition and doping method as defined in claim 33, further comprising the step of performing an oxidation treatment.--

--35. (New) The in-situ deposition and doping method as defined in claim 33, wherein the first thickness is at least about 8 times greater than the second thickness.--

--36. (New) The in-situ deposition and doping method as defined in claim 33, wherein the first thickness is at least about 10 times greater than the second thickness.--